

DECISION MEMO

Pumice Instream and Riparian Fish Habitat Restoration

Pepper-Lewis Side Channel, Clear Creek, and Muddy River

USDA Forest Service

Mount St. Helen National Volcanic Monument

Gifford Pinchot National Forest

Skamania County, Washington

T. 7 N., R. 7 E., Sections 6, 19

Background

The goals of the proposed instream and riparian restoration projects are to improve habitat for reintroduced Chinook and coho salmon and steelhead as well as resident bull trout through the addition of large and smaller logs along sections of the Lewis River (at Pepper Creek), Clear Creek, and the Muddy River; improve riparian shade along Clear Creek by thinning hardwoods; and improve channel connectivity and reduce sedimentation by removing old stream crossings.

Project Description

Pepper Lewis Side Channel

The proposed project is on a side channel located at the confluence of Pepper Creek with the Lewis River. The purpose of this project is to provide rearing habitat for reintroduced coho salmon. Approximately 0.25 miles of side channel habitat in the Lewis River would have 14 structures placed in it. Approximately 161 pieces of large wood material would be flown by helicopter to structure locations. An all terrain excavator would dig into the streambanks to anchor the wood in place. Woody material would come from a nearby timber sale on National Forest System land. The excavator would access the area using the Forest Service Road 9039-330. The final 800 feet to the area would be accessed by walking the excavator down the hillslope to the side channel. An alternate route for the excavator would be to walk down a spur road off the 9039-350 road for ½ mile across both National Forest System and private lands. At the Lewis River, the excavator would walk up the river for approximately ¼ mile until the side channel is reached. If this alternate route is used, the logs could be transported to the river by this route as well, eliminating the need for a helicopter to transport the logs.

The project affects 0.25 miles of stream habitat. Activities would be implemented over a 5-10 year time frame with work occurring between July 16th and August 15th each year.

Clear Creek

The lower 1.9 miles of Clear Creek lacks woody material and provides minimal structure for fish habitat. Phase one of the project would include adding approximately 1,100 pieces of large wood material to the creek to create pool habitat and provide complex structure to the stream.

Most of the wood would be placed between the bridge on Forest Road 9300, and the mouth at the Lewis River. Seven structures would be placed above the bridge to protect streambanks from eroding.

After phase one is complete and the results have been monitored for two or more years, phase two would include the placement of additional large woody material clusters to compliment the effects of phase 1 structures. Approximately 1,000 pieces of wood would be used to supplement existing structures and create new structures.

Trees for this project would come from a nearby timber sale unit on National Forest System lands. Trees would be hauled by log truck keeping them as long as possible. A log skidder or front end loader would move trees from the road to locations in the creek using the flood plain. An excavator will place the logs into groups forming clusters along the streambanks.

Point bars will be planted with conifers to provide stability. Large logs will be placed around seedlings and existing saplings to protect them from elk browsing.

Riparian enhancement in the form of hardwood thinning and conifer planting would occur on 10-50 acres of streamside vegetation. Some young alder patches would be thinned. Downed alder trees and branches would be used to pile around young coniferous plantings to protect from foraging deer and elk. The project would also provide shade producing vegetation along the stream adjacent riparian areas. Inner riparian acres would be planted with willow, cottonwood and big leaf maple (40-60 trees per acre).

One existing side channel (associated with a future acclimation pond to be built by PacifiCorp) would be better connected to the side channel and include some excavation to add depth. Woody material would also be added along the entire length of the side channel on both banks.

Approximately 2,200 feet above the bridge on Forest Road 9300, a section of braided channel that has been impacted by fallen trees would be redirected into the smaller braid to redirect the flood flows downstream to lessen impacts to the eroding streambank on the east side of Clear Creek.

The project affects 2.5 miles of stream habitat (1.9 miles of structure and 0.6 miles of streambank improvements). Activities would be implemented over a 5-10 year time frame with work occurring between July 16th and August 15th each year.

Muddy River

The Forest is proposing placing trees and logs in clusters along streambanks of the Muddy River to stabilize the floodplain, and create areas to plant conifer and hardwood seedlings. Some existing downed logs in the floodplain would be reconfigured and used in the new structures, or clusters of logs. Nurse logs would provide shade, browse protection, and water to newly planted seedlings. As the seedlings grow the banks will stabilize, and eventually the trees will provide a long-term source of large woody material to the Muddy River. Each nurse log structure would require between 10 and 50 logs and one to six rootwads, which would come from the Pacific Corps large wood removal programs in Swift Reservoir.

In addition to the nurse log structures, two side channels would be created to rear fish. This project would improve conditions in two ¾ mile length side channels. These side channels currently connect the mainstem Muddy River to unnamed tributaries. Improvements would be made to the side channels to improve fish rearing in low flow conditions, and provide instream structure. This project also adds wood to the side channel to promote structural diversity for juvenile fish (especially coho salmon) and provide velocity refugia.

The project is approximately seven miles in the length (one mile of this project was covered under another decision in 2008). The project would be implemented over a 5-10 year time frame with work occurring between July 16th and August 15th each year. One stream crossing point will be used at each access point to transport logs by either a one-end suspension-skidder or a log truck. The machinery anticipated includes one 300-class excavator, one small 100-class tracked excavator, and one rubber-tired skidder.

Old Stream Crossing Removals

This project would remove culverts/stream crossings in the Wildcat Thin planning area. Three culverts are on an unauthorized road off of Forest Road 8322 (near Forest Road 8322560 to the south) with two corduroy culverts and one pipe, and a 48" culvert pipe on Forest Road 2575050. The intent is to remove the fill and reshape stream banks to a stable configuration or matching the upstream/downstream configuration. The fill would be placed outside the stream banks on the old temp road but not outside the riparian reserve. Removal of these stream crossing would reduce the risk of sediment entering the Muddy River and Clear Creek stream channel during flow events. It will also provide channel connectivity.

Decision

I have decided to authorize the project in Lewis River as described above.

These activities fit within a category listed in Forest Service regulation 36 CFR 220.6. The specific category of action applicable to this project is Category 7: "Modification or maintenance of stream or lake aquatic habitat improvement structures using native materials or normal practices" (36 CFR 220.6(e)(7)).

Evaluation of Extraordinary Circumstances

The categorical exclusion is appropriate in this situation because there are no extraordinary circumstances related to the proposed action that would warrant further analysis and documentation in an EIS or EA. An interdisciplinary team, consisting of a wildlife biologist, fisheries biologist, botanist, hydrologist and archaeologist assessed and reported on this proposed project.

I have determined that there are no extraordinary circumstances and that this action would not result in effects that have the potential to significantly affect the environment. I considered the potential effects to federally listed fish and wildlife species, botanical and cultural resources, and water quality.

Threatened, Endangered or Proposed Species, and Designated Critical Habitat

There is suitable spotted owl nesting and foraging habitat adjacent to all the river reaches in the project area. Suitable habitat is close enough to the work sites to potentially be affected by noise disturbance generated by heavy equipment operating in the project areas. Since the allowable work window in these streams is after the critical early nesting season, the wildlife biologist determined that the project may affect but is not likely to adversely affect spotted owls. There would be no effect to Critical Habitat for the spotted owl.

The following project activities have the potential to result in short-term effects to Lower Columbia River bull trout, as well as Lower Columbia River steelhead trout, Chinook salmon, and coho salmon, as well as their Critical Habitats after these latter three species are reintroduced to the Lewis River:

- Short-term increases in suspended sediments during machine placement of logs and log transport in and crossing of streams.
- Short-term increases in suspended sediments during machine excavation of side channels. This can be mitigated by not opening the top of the side channel until excavation is complete on the rest of the side channel.
- Short term increases in suspended sediments during placement of woody material around seedlings and saplings.

The long-term benefits to these fish species are as follows:

- Nurse log structures will help reduce erosion rates of high water streambanks through structural stability and promote establishment of riparian vegetation. In turn, expected long-term benefits include providing floodplain stabilization, promoting riparian wood materials, riparian reestablishment, growth and expansion.
- Side Channels will provide quality rearing habitat for juvenile salmonids, primarily coho salmon.
- Removal of these stream crossings will reduce the risk of sediment entering the Muddy River and Clear Creek stream channel during flow events. It will also provide channel connectivity.
- This project will allow vegetation to thrive on point bars. High winter elk use in the drainage stunts conifer growth because of continued browsing of seedlings and saplings.

The potential effects to listed fish and Critical habitat are short-term, and when considered in context with the long-term benefits, these effects don't constitute an extraordinary circumstance.

There is no habitat for *Howellia aquatilis*, the only federally listed plant species suspected to occur on the Gifford Pinchot National Forest.

Forest Service Sensitive Species

At the time that the work would occur for this project there could be harlequin duck broods in the each of the three project areas. In the short-term, project activities would displace broods if they occurred in the project area, and may add sediment to the water in downstream habitat. In the long-term, the addition of large log structures may create pools that could be used as loafing sites for adults and broods, and may create nest sites as vegetation grows near the logs. Due to the short-term potential to impact harlequin ducks, this project may impact individuals or habitat, but

not likely contribute to a trend toward federal listing, or a loss of viability of the species or population.

There are seven Sensitive mollusk species that could be impacted by this project. The potential to impact terrestrial mollusks would occur at heavy equipment access points, especially where equipment would travel overland to access the Lewis River at Pepper Creek, and potentially along the river edges at the Lewis River side channel site and possibly Clear Creek. The floodplains where the work would occur are not habitat for these mollusks, and the stream edges are probably not important habitat due to annual inundation by spring floods.

Since the heavy equipment would access the area during the summer when mollusks are not likely to be active on the surface, no serious impacts are expected to occur.

Since there is a low potential to impact individual mollusks at specific structure sites, this project may impact individuals or habitat, but would not likely contribute to a trend toward federal listing, or a loss of viability of the species or population.

Heterotheca oregona, a Regional Forester's Sensitive plant species in Washington State (but not previously documented from, or suspected to occur on the Gifford Pinchot National Forest), was found to occur on cobble and ash deposits along the Muddy River (i.e. on sand/gravel bars), just above the confluence with the Lewis River. Project related activities occurring near the confluence of Clear Creek and the Muddy River will be designed so as to avoid, and thus protect, *Heterotheca oregona* individuals. Unoccupied habitat for this species may be impacted by project activities, but since suitable habitat appears to be common along the Muddy River, these impacts are unlikely to prevent spread and establishment of the species under favorable conditions. In addition, project actions will be limited in scope and duration, and unlikely to have long term effects on the habitat.

A number of Sensitive species (1 lichen and 11 fungi) are considered survey impractical; therefore we do not know whether they are present at the site (see pre-field documentation for complete list of species considered survey impractical). However, based on the habitat/substrate present at the project sites (mostly mudflow deposits from the 1980 eruption of Mt. St. Helens, along with riparian sand, gravel, and cobble), as well as the lack of known occurrences of these species within the adjacent 5th field watershed, the likelihood that these species are present is considered to be low.

Floodplains, Wetlands, or Municipal Watersheds

Executive Order 11988 (Floodplain Management) is to avoid adverse impacts associated with the occupancy and modification of floodplains. The project sites are located in or near floodplains. This project would have little or no impact associated with any occupancy of the identified floodplains since the projects will be entirely on National Forest System lands.

Executive Order 11990 (Wetlands Management) is to avoid adverse impacts associated with destruction or modification of wetlands. The project sites are not located in any identified wetlands since most of the project activities are to take place within the channels and stream banks of the Muddy River, Clear Creek and the Pepper Creek/Lewis River junction area. Side

channel projects for instream fish habitat restoration identified in Clear Creek (below the bridge on Forest Road 9300) and Pepper–Lewis show no wetland features. Riparian improvements along key sections of Clear Creek (above and below the bridge on Forest Road 9300) were not found to have any wetland components. This decision will not affect wetlands since wetlands are limited due to the rocky, unconsolidated soils with limited organic profile, and no hydrophytic vegetation.

Municipal watersheds are managed under multiple use prescriptions in land and resource management plans. There are no municipal supply sub-watersheds within the Muddy River and Upper Lewis River watersheds.

Other Resources

There would be no effects to Congressionally-designated areas, inventoried roadless areas, research natural areas, American Indian religious or cultural sites, or to archeological sites or historic properties.

Scoping and Public Involvement

A public scoping letter was sent out to the Gifford Pinchot National Forest’s mailing list on September 15, 2009. Responses were received from the Washington State Department of Ecology, Hugh Fiscus, Jim Hutchison, and Tom Linde.

The comments received were used considered in designing the project.

Findings Required by Law

Endangered Species Act

An assessment of all endangered, threatened and sensitive species was conducted and it was determined that this decision is compliant with the Endangered Species Act.

The project may affect but is not likely to adversely affect spotted owls. There would be no effect to critical habitat for the spotted owl. This project is covered under the US Fish and Wildlife Service’s Wildlife Programmatic Biological Opinion (March 2001).

Formal fisheries consultation for this project is covered under the June 14th, 2007 USFWS Biological Opinion and letter of Concurrence USDA Forest Service, USDI Bureau of Land Management and the Coquille Indian Tribe for Programmatic Aquatic Restoration Activities in Oregon and Washington That Affect ESA-listed Fish, Wildlife, and Plant Species and their Critical Habitats.

The potential effects to listed fish and Critical habitat are short-term and would occur primarily during project implementation. When considered in context with the long-term benefits, these effects don’t constitute an extraordinary circumstance.

National Forest Management Act

The interdisciplinary team reviewed the applicable standards and guidelines of this proposal, and determined that this decision is compliant with the National Forest Management Act and consistent with the Gifford Pinchot National Forest Land and Resource Management Plan, as amended.

National Historic Preservation Act

A heritage resource analysis was completed in compliance with the National Historic Preservation Act. It was determined that this project would have an effect on historic properties.

Design Criteria/Mitigation Measures

The project design criteria, conservation measures, and general practices and requirements for this project are shown in Appendix A.

Implementation Date

This decision is effective immediately. While this decision is not subject to appeal pursuant to Forest Service regulations at 36 CFR 215.8(a)(4), I encourage you to discuss this project with me if you have any concerns about implementation.

Contact Person

A project file has been prepared in conjunction with this decision memo. For additional information regarding this decision or the Forest Service appeal process, contact Erin Black, Mt. Adams Ranger District, 2455 Hwy 141, Trout Lake, WA 98650. (509) 395-3411.

Responsible Official:

/s/ *Diana Perez*

DIANA PEREZ

Deputy Monument Manager

Mount St. Helens National Volcanic Monument

March 4, 2010

Date Signed

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Appendix A

Sensitive species mitigations

- Prior to the inception of project activities, botany personnel shall flag occurrences of *Heterotheca oregona*, so that contractors driving large equipment/placing logs may be routed around plants and adjacent habitat.

Project Design Feature Standards for Preventing and Managing Invasive Plants

- To prevent the introduction of noxious weeds into the project area, all heavy equipment, or other off- road equipment used in the project is to be cleaned to remove soil, seeds, vegetative matter or other debris that could contain seeds. Cleaning should be done before entering National Forest Lands, and when equipment moves from or between project sites or areas known to be infested into other areas, infested or otherwise. Cleaning of the equipment may include pressure washing. An inspection will be required to ensure that equipment is clean before work can begin. (Equipment cleaning clause Wo-C6.35) (Standard 2, Pacific Northwest Invasive Plant Program Record of Decision, 2005).
- Inspect active gravel, fill, sand stockpiles, quarry sites, and borrow material for invasive plants before use and transport. Treat or require treatment of infested sources before any use of pit material. Use only gravel, fill, sand, and rock that is judged to be weed free by District or Forest weed specialists (Standard 7, Pacific Northwest Invasive Plant Program Record of Decision, 2005).
- Use weed-free straw and mulch for all projects, conducted or authorized by the Forest Service, on National Forest System Lands (Standard 3, Pacific Northwest Invasive Plant Program Record of Decision, 2005).
- To the extent practicable, take one of more of the following actions:
 1. Remove/control invasive species or control fruiting of invasive species prior to project commencement, in order to prevent seed spread (because of the moderate to high level of infestations for many different invasive plant species spread over a wide area, this is unlikely to be financially or practically feasible).
 2. Control invasive species along routes where heavy equipment will pass (in order to prevent moving propagules to new sites).
 3. Re-vegetate areas disturbed by project activities, in order to occupy habitat that would otherwise be colonized by invasive species.

Aquatic/Fisheries Mitigation Measures

- 1) Minimize as much as possible any excessive sedimentation into stream waters when constructing stream bank protection (e.g. rootwads).
- 2) The placement of instream structures will need to be timed with seasonal low flow which normally occurs from mid-summer through early autumn.

- 3) When creating a trench for the emplacement of a log for instream habitat and stream bank protection, do not leave trench exposed without finishing work.
- 4) When removing dirt to make trenches, do not place dirt near edge of stream bank but away from it.
- 5) Riparian planting along Clear Creek, place tree saplings in appropriate areas above 1 ½ bankfull height.
- 6) Where work necessitates the operation of heavy equipment within the bankfull width of stream crossings, the timing and extent of this work will be conducted to minimize negative impacts to fish. Accumulations of soil or debris shall be removed from drive mechanisms and undercarriage of all heavy equipment prior to its working within the bankfull width. Every effort will be made to avoid stream crossing with heavy equipment.
- 7) Do not open the top of the side channel until excavation is complete on the rest of the side channel.
- 8) Control of invasive weeds will occur where deemed necessary, prior to and after earth disturbing activities.
- 9) Follow instream work Water Work Windows for this area designated by WDFW (July 1 – July 31) for fish bearing streams.

The Design Criteria, Conservation Measures, General Practices and Requirements for this project will also include (as listed in the 2007 Regional Programmatic Restoration BO):

Large Woody, Boulder and Gravel Placement projects.

- Place LW and boulders only in those areas where they would naturally occur and in a manner that closely mimics natural accumulations for that particular stream type.
- LW includes whole conifer and hardwood trees, logs and rootwads. LW size (diameter and length) should account for bankfull width and stream discharge rates. When available, trees with rootwads should be a minimum of 1.5x bankfull channel width, while logs without rootwads should be a minimum of 2.0x bankfull width. Structures may partially or completely span stream channels or be positioned along stream banks.
- Key boulders (footings) or LW can be buried into the stream bank or channel but shall not constitute the dominant placement of boulders and LW.
- Anchoring LW with cable should be used sparingly, primarily for the protection of infrastructure and in consideration of downstream landowner concerns. Before using cable attempt to use, when feasible, the following anchoring alternatives, in preferential order: 1) use adequate sized wood sufficient for stability; 2) orient and place wood in such a way that wood movement is unlikely; 3) use ballasting (gravel and/or rock) to increase mass of the structure to resist movement; 4) use large boulders as anchor points for the LW; and 5) pin wood to large rock with rebar to increase wood weight.

Reconnection of Existing Side Channels and Alcoves

- Excavated material removed from side-channels or alcoves shall be hauled to an upland site or spread across the adjacent floodplain in a manner that does not restrict floodplain capacity.
- Design and construct side-channels in such a manner as to prevent the capture and relocation of the main channel.

- Design project to naturally maintain inlet and outlet connections with the main stream channel (i.e. placement of LW to increase scour).
- Should fish rescue occur, use fish handling criteria as described in the USFWS and NOAA Restoration BO.

Removal of Legacy Structures.

- If the structure being removed contains material (i.e., LW, boulders, etc.) not typically found within the stream or floodplain at that site, remove material from the 100 year floodplain.
- If the structure being removed contains material (i.e., LW, boulders, etc.) typically found within the stream or floodplain at that site, the material can be reused to implement habitat improvements described under Large Wood, Boulder and Gravel Placement activity category in the restoration BO.
- If the structure being removed is keyed into the bank, fill in the “key” holes with native materials as to restore contours of streambank and floodplain. Compact the fill material adequately to prevent washing out of the soil during over bank flooding. Do not mine materials from the stream channel to fill in “key” holes.
- When removal of buried (keyed) structures may result in significant disruption to riparian vegetation and/or the floodplain, consider using a chainsaw to extract the portion of the log within the channel and leaving the buried sections within the streambank.
- Assess sites for a potential to headcut below natural stream gradient. Along with field surveys, refer to Appendix 1 for a guide to assess headcut potential.
- If headcutting and channel incision are likely to occur due to structure removal, additional measures must be taken to reduce these impacts (see grade control options described under Headcut Stabilization Activity category).
- If the structure is being removed because it has caused an over-widening of the channel, consider implementing other BO restoration Categories to decrease the width to depth ratio of the stream at that location to a level commensurate with upstream and downstream (within the same channel type).

Riparian Planting

- An experienced silviculturist, botanist, ecologist, or other associated technician shall be involved in designing vegetation treatments.
- No roads or landings will be constructed.
- Species to be planted must be of the same species that naturally occurs in the project area.
- Concentrate planting above the bankfull elevation.

Best Management Practices

Pollution and Erosion Control Plan-

- Equipment will be inspected prior to use to ensure no hydraulic, fuel or oil leaks are present.
- All refueling of heavy equipment and vehicles will occur near the landing area where logs are decked to prevent spills and minimize impacts to the aquatic system should a spill occur.

- The Contractor will develop a Spill Prevention Control and Containment Plan that will contain a description of hazardous materials onsite, and material used to cleanup a spill if one should occur. At a minimum they will also be required to carry oil absorbent pads on each machine, and an oil absorbing floating boom will stored onsite at all times should a spill occur in the Muddy River.

1. General PDCs and CM Applicable to ALL Activity Categories.

a) General PDCs: All projects will be guided by PDCs that help restore or enhance stream channel, riparian, wetland, and/or upland functions that would occur under natural disturbance regimes.

b) General CMs: CMs are intended to minimize effects to the aquatic environment, and the following apply, when relevant, to all 19 activities.

i. Technical Skill and Planning Requirements

- Ensure that an experienced professional fisheries biologist, hydrologist or technician is involved in the design of all projects covered by this BO. The experience should be commensurate with technical requirements of a project. If ESA-listed wildlife/plant species occur in the planning area, as determined by a unit wildlife biologist or botanist, the appropriate specialist will assist with project design.
- Planning and design includes field evaluations and site-specific surveys, which may include reference reach evaluations that describe the appropriate geomorphic context in which to implement the project. Planning and design involves appropriate expertise from professional staff or experienced technicians. (e.g., engineer, silviculturist, fire/fuels specialists.)
- The project biologist should ensure that PDCs and CMs are incorporated into any implementation contract agreements. If a biologist is not the Contracting Officers Representative (COR), then the biologist must regularly coordinate with the project COR to insure the PDCs and CMs are being followed.

ii. State and Federal Requirements

- Follow the appropriate state (Oregon Dept. of Fish and Wildlife (ODFW) or Washington Department of Fish and Wildlife (WDFW)) guidelines for timing of instream water work. Exceptions to ODFW and WDFW in-water work windows must be requested and granted from the appropriate state agency. Exceptions can be approved through documented phone conversations or e-mail messages with the state agency(s). Such guidelines are intended to prevent project implementation in fish spawning habitat when fish spawning is taking place or while eggs and young fish are in or associated with channel substrates.
- Project actions will follow all provisions and requirements (including permits) of the Clean Water Act for maintenance of water quality standards as described by Oregon Department of Environmental Quality (Oregon FS and BLM), Washington Department of Ecology (Washington FS and BLM) and the MOU between WDFW and the FS regarding Hydraulic Projects Conducted by USDA Forest Service, Pacific Northwest Region, January 2005.

- c. All regulatory permits and official project authorizations will be secured prior to project implementation.

iii. Pollution and Erosion Control Plans-Administrative Units will develop and implement a Pollution and Erosion Control Plan (PECP) for each authorized project, one that includes methods and measures to minimize erosion and sedimentation associated with the project. The following measures will assist in the creation of a PECP.

- a. Spill Prevention Control and Containment Plan (SPCCP)- The contractor will be required to have a written SPCCP, which describes measures to prevent or reduce impacts from potential spills (fuel, hydraulic fluid, etc). The SPCCP shall contain a description of the hazardous materials that will be used, including inventory, storage, handling procedures; a description of quick response containment supplies that will be available on the site (*e.g.*, a silt fence, straw bales, and an oil absorbing floating boom whenever surface water is present.
- b. The PECP should be included in construction contracts of force account work plans.
- c. The PECP must be commensurate with the scale of the project and include the pertinent elements of iv, v, vi and vii listed below.

iv. Minimize Site Preparation Impacts

- a. Establish staging areas (used for construction equipment storage, vehicle storage, fueling, servicing, hazardous material storage, etc) beyond the 100-year floodplain in a location and manner that will preclude erosion into or contamination of the stream or floodplain.
- b. Minimize clearing and grubbing activities when preparing staging, project, and or stockpile areas. Stockpile large wood, trees, vegetation, sand, topsoil and other excavated material, that is removed when establishing area(s) for site restoration
- c. Materials used for implementation of aquatic restoration categories (e.g., large wood, boulders, fencing material etc.) can be staged within the 100-year floodplain.
- d. Prior to construction, flag critical riparian vegetation areas, wetlands, and other sensitive sites to prevent ground disturbance in these areas.
- e. Place sediment barriers prior to construction around sites where significant levels of erosion may enter the stream directly or through road ditches. Maintain barriers throughout construction.
- f. Where appropriate, include hazard tree removal (amount and type) in project design. Fell hazard trees within riparian areas when they pose a safety risk. If possible, fell trees towards the stream. Keep felled trees on-site when needed to meet coarse woody debris objectives.
- g. Wildlife biologist should determine if a hazard tree is a potential ESA listed bird nest tree. Nesting trees that are hazardous to restoration activities may only be removed outside of active nesting season. No BE nest trees will be removed. Hazard trees that are also suitable NSO and murrelet nest trees may only be removed if there are sufficient alternative suitable NSO and murrelet nest trees within the same stand that the hazard tree is located.

v. Minimize Heavy Equipment Impacts

- a. Consider contracting with operators who use non-petroleum lubricants and fluids in their machinery.
- b. The size and capability of heavy equipment will be commensurate with the project.
- c. All equipment used for instream work shall be cleaned and leaks repaired prior to entering the project area. Remove external oil and grease, along with dirt and mud prior to construction. Thereafter, inspect equipment daily for leaks or accumulations of grease, and fix any identified problems before entering streams or areas that drain directly to streams or wetlands
- d. All equipment shall be cleaned of all dirt and weeds before entering the project area to prevent the spread of noxious weeds.
- e. Equipment used for instream or riparian work shall be fueled and serviced in an established staging area outside of riparian zone. When not in use, vehicles shall be stored in the staging area.
- f. Minimize the number and length of stream crossings and access routes through riparian areas. Crossings and access routes should be at right angles. Stream crossings shall not increase risks of channel re-routing at low and high water conditions and shall avoid potential listed fish spawning areas when possible.
- g. Existing roadways or travel paths will be used whenever reasonable. Minimize the number of new access paths to minimize impacts to riparian vegetation and functions.